

I Claim:

1. An optical storage medium, comprising:

a first layer having a pattern of features in at least one

5 major surface; and

a first reflective layer adjacent said feature pattern, said

first reflective layer including a metal alloy, said

metal alloy including silver and yttrium, wherein the

relationship between the amounts of silver and yttrium

10 in the metal alloy is defined by Ag_xY_w where $0.9500 < x$
< 0.9999 and $0.0001 < w < 0.05$.

2. The optical storage medium of claim 1, wherein $0.001 < w < 0.03$.

15

3. The optical storage medium of claim 1, wherein said first reflective layer is high reflective layer.

4. The optical storage medium of claim 1, further

20 comprising:

a second layer having a second pattern of features in at

least one major surface; and

a second reflective layer, wherein said first reflective

layer is a semi-reflective layer and said second

25 reflective layer is a high reflective layer.

5. The optical storage medium of claim 4, wherein said second reflective layer includes said metal alloy.

5 6. The optical storage medium of claim 4, wherein the first pattern of features includes a spiral groove.

7. The optical storage medium of claim 4, further comprising:

10 a third layer adjacent said first reflective layer, said third layer including a dielectric material;
a fourth layer, said fourth layer including an optically re-recordable material; and
a fifth layer, said fifth layer including a dielectric
15 material.

8. The optical storage medium of claim 7, wherein said optically re-recordable material is a phase-changeable material.

20

9. The optical storage medium of claim 8, wherein said optically re-recordable material further comprises a phase changeable material selected from the group consisting of Ge-Sb-Te, As-In-Sb-Te, Cr-Ge-Sb-Te, As-Te-Ge, Te-Ge-Sn, Te-
25 Ge-Sn-O, Te-Se, Sn-Te-Se, Te-Ge-Sn-Au, Ge-Sb-Te, Sb-Te-Se,

In-Se-Tl, In Sb, In-Sb-Se, In-Se-Tl-Co, Bi-Ge, Bi-Ge-Sb, Bi-Ge-Te, and Si-Te-Sn.

10. The optical storage medium of claim 7, wherein said
5 optically re-recordable material is a magneto-optic material.

11. The optical storage medium of claim 10, wherein said
optically re-recordable material further comprises a
10 magneto-optic material selected from the group consisting of Tb-Fe-Co and Gd-Tb-Fe.

12. An optical storage medium, comprising:
a first layer having a pattern of features in at least one
15 major surface; and
a first reflective layer adjacent said feature pattern, said
first reflective layer including a metal alloy, said
metal alloy including silver and scandium, wherein the
relationship between the amounts of silver and scandium
20 in the metal alloy is defined by Ag_xSc_w where $0.9500 < x < 0.9999$ and $0.0001 < w < 0.05$.

13. The optical storage medium of claim 12, wherein $0.001 < w < 0.03$.

25

14. The optical storage medium of claim 12, wherein said first reflective layer is high reflective layer.

15. The optical storage medium of claim 12, further comprising:

a second layer having a second pattern of features in at least one major surface; and

a second reflective layer, wherein said first reflective layer is a semi-reflective layer and said second reflective layer is a high reflective layer.

16. The optical storage medium of claim 15, wherein said second reflective layer includes said metal alloy.

17. The optical storage medium of claim 15, wherein the first pattern of features includes a spiral groove.

18. The optical storage medium of claim 15, further comprising:

a third layer adjacent said first reflective layer, said third layer including a dielectric material;
a fourth layer, said fourth layer including an optically recordable material; and
a fifth layer, said fifth layer including a dielectric material.

19. The optical storage medium of claim 19, wherein said optically re-recordable material is a phase-changeable material.

5

20. The optical storage medium of claim 19, wherein said optically re-recordable material further comprises a phase changeable material selected from the group consisting of Ge-Sb-Te, As-In-Sb-Te, Cr-Ge-Sb-Te, As-Te-Ge, Te-Ge-Sn, Te-Ge-Sn-O, Te-Se, Sn-Te-Se, Te-Ge-Sn-Au, Ge-Sb-Te, Sb-Te-Se, In-Se-Tl, In Sb, In-Sb-Se, In-Se-Tl-Co, Bi-Ge, Bi-Ge-Sb, Bi-Ge-Te, and Si-Te-Sn.

21. The optical storage medium of claim 19, wherein said optically re-recordable material is a magneto-optic material.

22. The optical storage medium of claim 21, wherein said optically re-recordable material further comprises a magneto-optic material selected from the group consisting of Tb-Fe-Co and Gd-Tb-Fe.

23. An optical storage medium, comprising:
a first layer having a pattern of features in at least one major surface; and

25

a first reflective layer adjacent said feature pattern, said
first reflective layer including a metal alloy, said
metal alloy including silver and bismuth, wherein the
relationship between the amounts of silver and bismuth
5 in the metal alloy is defined by Ag_xBi_w where $0.9500 < x < 0.9999$ and $0.0001 < w < 0.05$.

24. The optical storage medium of claim 23, wherein $0.001 < w < 0.03$.

10

25. The optical storage medium of claim 23, wherein said
first reflective layer is high reflective layer.

26. The optical storage medium of claim 23, further

15 comprising:

a second layer having a second pattern of features in at
least one major surface; and

a second reflective layer, wherein said first reflective
layer is a semi-reflective layer and said second

20 reflective layer is a high reflective layer.

27. The optical storage medium of claim 26, wherein said
second reflective layer includes said metal alloy.

28. The optical storage medium of claim 26, wherein the first pattern of features includes a spiral groove.

29. The optical storage medium of claim 26, further

5 comprising:

a third layer adjacent said first reflective layer, said

third layer including a dielectric material;

a fourth layer, said fourth layer including an optically re-recordable material; and

10 a fifth layer, said fifth layer including a dielectric material.

30. The optical storage medium of claim 29, wherein said optically re-recordable material is a phase-changeable

15 material.

31. The optical storage medium of claim 30, wherein said optically re-recordable material further comprises a phase changeable material selected from the group consisting of

20 Ge-Sb-Te, As-In-Sb-Te, Cr-Ge-Sb-Te, As-Te-Ge, Te-Ge-Sn, Te-Ge-Sn-O, Te-Se, Sn-Te-Se, Te-Ge-Sn-Au, Ge-Sb-Te, Sb-Te-Se, In-Se-Tl, In Sb, In-Sb-Se, In-Se-Tl-Co, Bi-Ge, Bi-Ge-Sb, Bi-Ge-Te, and Si-Te-Sn.

32. The optical storage medium of claim 29, wherein said optically re-recordable material is a magneto-optic material.

5 33. The optical storage medium of claim 32, wherein said optically re-recordable material further comprises a magneto-optic material selected from the group consisting of Tb-Fe-Co and Gd-Tb-Fe.

10 34. An optical storage medium, comprising:
a first layer having a pattern of features in at least one major surface; and
a first reflective layer adjacent said feature pattern, said
first reflective layer including a metal alloy, said
15 metal alloy including silver, copper, and element A,
where A is selected from the group of elements
consisting of yttrium, scandium, or bismuth, wherein
the relationship between the amounts of silver, copper,
and element A in the metal alloy is defined by $Ag_xCu_zA_w$
20 where $0.85 < x < 0.9998$, $0.0001 < z < 0.10$, and $0.0001 < w < 0.05$.

35. The optical storage medium of claim 34, wherein $0.001 < w < 0.03$.

36. The optical storage medium of claim 34, wherein said first reflective layer is high reflective layer.

37. The optical storage medium of claim 34, further

5 comprising:

a second layer having a second pattern of features in at least one major surface; and

a second reflective layer, wherein said first reflective layer is a semi-reflective layer and said second

10 reflective layer is a high reflective layer.

38. The optical storage medium of claim 37, wherein said second reflective layer includes said metal alloy.

15 39. The optical storage medium of claim 37, wherein the first pattern of features includes a spiral groove.

40. The optical storage medium of claim 37, further comprising:

20 a third layer adjacent said first reflective layer, said third layer including a dielectric material;

a fourth layer, said fourth layer including an optically recordable material; and

a fifth layer, said fifth layer including a dielectric
25 material.

41. The optical storage medium of claim 40, wherein said optically re-recordable material is a phase-changeable material.

5

42. The optical storage medium of claim 41, wherein said optically re-recordable material further comprises a phase changeable material selected from the group consisting of Ge-Sb-Te, As-In-Sb-Te, Cr-Ge-Sb-Te, As-Te-Ge, Te-Ge-Sn, Te-Ge-Sn-O, Te-Se, Sn-Te-Se, Te-Ge-Sn-Au, Ge-Sb-Te, Sb-Te-Se, In-Se-Tl, In Sb, In-Sb-Se, In-Se-Tl-Co, Bi-Ge, Bi-Ge-Sb, Bi-Ge-Te, and Si-Te-Sn.

43. The optical storage medium of claim 40, wherein said optically re-recordable material is a magneto-optic material.

44. The optical storage medium of claim 43, wherein said optically re-recordable material further comprises a magneto-optic material selected from the group consisting of Tb-Fe-Co and Gd-Tb-Fe.

45. An optical storage medium, comprising:
a first layer having a pattern of features in at least one major surface; and

a first reflective layer adjacent said feature pattern, said
first reflective layer including a metal alloy, said
metal alloy including silver, copper, and magnesium,
wherein the relationship between the amounts of silver,
5 copper, and magnesium in the metal alloy is defined by
 $Ag_xCu_zMg_w$ where $0.85 < x < 0.9998$, $0.0001 < z < 0.10$,
and $0.0001 < w < 0.05$.

46. The optical storage medium of claim 45, wherein $0.001 <$
10 $w < 0.03$.

47. The optical storage medium of claim 45, wherein said
first reflective layer is high reflective layer.

15 48. The optical storage medium of claim 45, further
comprising:
a second layer having a second pattern of features in at
least one major surface; and
a second reflective layer, wherein said first reflective
20 layer is a semi-reflective layer and said second
reflective layer is a high reflective layer.

49. The optical storage medium of claim 48, wherein said
second reflective layer includes said metal alloy.

25

50. The optical storage medium of claim 48, wherein the first pattern of features includes a spiral groove.

51. The optical storage medium of claim 48, further

5 comprising:

a third layer adjacent said first reflective layer, said
third layer including a dielectric material;
a fourth layer, said fourth layer including an optically re-
recordable material; and
10 a fifth layer, said fifth layer including a dielectric
material.

52. The optical storage medium of claim 51, wherein said
optically re-recordable material is a phase-changeable

15 material.

53. The optical storage medium of claim 52, wherein said
optically re-recordable material further comprises a phase
changeable material selected from the group consisting of

20 Ge-Sb-Te, As-In-Sb-Te, Cr-Ge-Sb-Te, As-Te-Ge, Te-Ge-Sn, Te-
Ge-Sn-O, Te-Se, Sn-Te-Se, Te-Ge-Sn-Au, Ge-Sb-Te, Sb-Te-Se,
In-Se-Tl, In Sb, In-Sb-Se, In-Se-Tl-Co, Bi-Ge, Bi-Ge-Sb, Bi-
Ge-Te, and Si-Te-Sn.

54. The optical storage medium of claim 51, wherein said optically re-recordable material is a magneto-optic material.

5 55. The optical storage medium of claim 54, wherein said optically re-recordable material further comprises a magneto-optic material selected from the group consisting of Tb-Fe-Co and Gd-Tb-Fe.

10 56. An optical storage medium, comprising:
a first layer having a pattern of features in at least one major surface; and
a first reflective layer adjacent said feature pattern, said first reflective layer including a metal alloy, said
15 metal alloy including silver, copper, and cobalt, wherein the relationship between the amounts of silver, copper, and cobalt in the metal alloy is defined by $Ag_xCu_zCo_w$ where $0.85 < x < 0.9998$, $0.0001 < z < 0.10$, and $0.0001 < w < 0.05$.

20

57. The optical storage medium of claim 56, wherein $0.001 < w < 0.03$.

58. The optical storage medium of claim 56, wherein said
25 first reflective layer is high reflective layer.

59. The optical storage medium of claim 56, further comprising:

a second layer having a second pattern of features in at

5 least one major surface; and

a second reflective layer, wherein said first reflective layer is a semi-reflective layer and said second reflective layer is a high reflective layer.

10 60. The optical storage medium of claim 59, wherein said second reflective layer includes said metal alloy.

61. The optical storage medium of claim 59, wherein the first pattern of features includes a spiral groove.

15

62. The optical storage medium of claim 59, further comprising:

a third layer adjacent said first reflective layer, said third layer including a dielectric material;

20 a fourth layer, said fourth layer including an optically re-recordable material; and

a fifth layer, said fifth layer including a dielectric material.

63. The optical storage medium of claim 59, wherein said optically re-recordable material is a phase-changeable material.

5 64. The optical storage medium of claim 63, wherein said optically re-recordable material further comprises a phase changeable material selected from the group consisting of Ge-Sb-Te, As-In-Sb-Te, Cr-Ge-Sb-Te, As-Te-Ge, Te-Ge-Sn, Te-Ge-Sn-O, Te-Se, Sn-Te-Se, Te-Ge-Sn-Au, Ge-Sb-Te, Sb-Te-Se,
10 In-Se-Tl, In Sb, In-Sb-Se, In-Se-Tl-Co, Bi-Ge, Bi-Ge-Sb, Bi-Ge-Te, and Si-Te-Sn.

65. The optical storage medium of claim 59, wherein said optically re-recordable material is a magneto-optic
15 material.

66. The optical storage medium of claim 65, wherein said optically re-recordable material further comprises a magneto-optic material selected from the group consisting of
20 Tb-Fe-Co and Gd-Tb-Fe.

67. An optical storage medium, comprising:
a first layer having a pattern of features in at least one major surface; and

a first reflective layer adjacent said feature pattern, said
first reflective layer including a metal alloy, said
metal alloy including silver, zinc, and magnesium,
wherein the relationship between the amounts of silver,
5 zinc, and magnesium in the metal alloy is defined by
 $Ag_xZn_yMg_w$ where $0.8000 < x < 0.9998$, $0.0001 < y < 0.15$,
and $0.0001 < w < 0.05$.

68. The optical storage medium of claim 67, wherein $0.001 <$
10 $w < 0.03$.

69. The optical storage medium of claim 67, wherein said
first reflective layer is high reflective layer.

15 70. The optical storage medium of claim 67, further
comprising:
a second layer having a second pattern of features in at
least one major surface; and
a second reflective layer, wherein said first reflective
20 layer is a semi-reflective layer and said second
reflective layer is a high reflective layer.

71. The optical storage medium of claim 70, wherein said
second reflective layer includes said metal alloy.

72. The optical storage medium of claim 70, wherein the first pattern of features includes a spiral groove.

73. The optical storage medium of claim 70, further

5 comprising:

a third layer adjacent said first reflective layer, said

third layer including a dielectric material;

a fourth layer, said fourth layer including an optically re-recordable material; and

10 a fifth layer, said fifth layer including a dielectric material.

74. The optical storage medium of claim 73, wherein said optically re-recordable material is a phase-changeable

15 material.

75. The optical storage medium of claim 74, wherein said optically re-recordable material further comprises a phase changeable material selected from the group consisting of

20 Ge-Sb-Te, As-In-Sb-Te, Cr-Ge-Sb-Te, As-Te-Ge, Te-Ge-Sn, Te-Ge-Sn-O, Te-Se, Sn-Te-Se, Te-Ge-Sn-Au, Ge-Sb-Te, Sb-Te-Se, In-Se-Tl, In Sb, In-Sb-Se, In-Se-Tl-Co, Bi-Ge, Bi-Ge-Sb, Bi-Ge-Te, and Si-Te-Sn.

76. The optical storage medium of claim 73, wherein said optically re-recordable material is a magneto-optic material.

5 77. The optical storage medium of claim 76, wherein said optically re-recordable material further comprises a magneto-optic material selected from the group consisting of Tb-Fe-Co and Gd-Tb-Fe.

10 78. An optical storage medium, comprising:
a first layer having a pattern of features in at least one major surface; and
a first reflective layer adjacent said feature pattern, said first reflective layer including a metal alloy, said
15 metal alloy including silver, zinc, and cobalt, wherein the relationship between the amounts of silver, zinc, and cobalt in the metal alloy is defined by $Ag_xZn_yCo_w$ where $0.8000 < x < 0.9998$, $0.0001 < y < 0.15$, and $0.0001 < w < 0.05$.

20

79. The optical storage medium of claim 78, wherein $0.001 < w < 0.03$.

80. The optical storage medium of claim 78, wherein said
25 first reflective layer is high reflective layer.

81. The optical storage medium of claim 78, further comprising:

a second layer having a second pattern of features in at

5 least one major surface; and

a second reflective layer, wherein said first reflective layer is a semi-reflective layer and said second reflective layer is a high reflective layer.

10 82. The optical storage medium of claim 30, wherein said second reflective layer includes said metal alloy.

83. The optical storage medium of claim 30, wherein the first pattern of features includes a spiral groove.

15

84. The optical storage medium of claim 30, further comprising:

a third layer adjacent said first reflective layer, said third layer including a dielectric material;

20 a fourth layer, said fourth layer including an optically recordable material; and

a fifth layer, said fifth layer including a dielectric material.

85. The optical storage medium of claim 84, wherein said optically re-recordable material is a phase-changeable material.

5 86. The optical storage medium of claim 85, wherein said optically re-recordable material further comprises a phase changeable material selected from the group consisting of Ge-Sb-Te, As-In-Sb-Te, Cr-Ge-Sb-Te, As-Te-Ge, Te-Ge-Sn, Te-Ge-Sn-O, Te-Se, Sn-Te-Se, Te-Ge-Sn-Au, Ge-Sb-Te, Sb-Te-Se,
10 In-Se-Tl, In Sb, In-Sb-Se, In-Se-Tl-Co, Bi-Ge, Bi-Ge-Sb, Bi-Ge-Te, and Si-Te-Sn.

87. The optical storage medium of claim 84, wherein said optically re-recordable material is a magneto-optic
15 material.

88. The optical storage medium of claim 87, wherein said optically re-recordable material further comprises a magneto-optic material selected from the group consisting of
20 Tb-Fe-Co and Gd-Tb-Fe.